

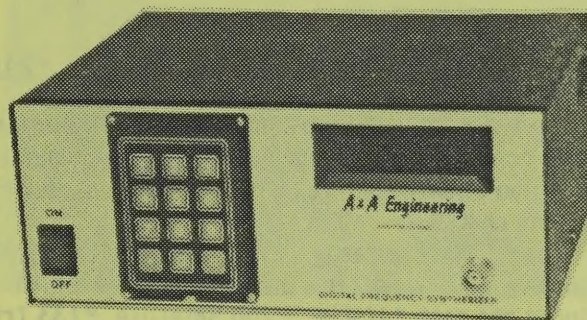
ELECTRONIC KITS & ASSEMBLIES

DIRECT DIGITAL FREQUENCY SYNTHESIZER #102 & #103

This synthesizer provides an output of 1/2V peak to peak from 1Hz to in excess of 6.5 MHz with 1 Hz resolution. Because direct digital synthesis is used, the unit has no VCO or PLL and incurs no loop settling time. Available as a complete bench top generator housed in an 8 X 6 X 3.25 enclosure, complete with RF unit, microprocessor controller, seven digit - seven segment display, keyboard and 110V AC power supply.

The bench top unit features a 12-key keyboard and supporting program. The controller will accept as many as 32 keys and there is unused EPROM and RAM space for those who wish to program their own special features. Also available in kit form or assembled & tested circuit boards (sub-assemblies). For special applications a custom version that supplies both SINE and COSINE (Quadrature) signals is available. See our price list for details.

For technical information refer to the FEB 85' QST Article by Fred Williams or the 1987 ARRL Amateur Radio Handbook, Chapter 29.



450 MHz SPECTRUM ANALYZER #117, #118, #119, #121 & #450

This spectrum analyzer was adapted from the article by Al Helfrick, K2BLA, and was featured in the November 1985 Issue of QST Magazine. The circuit is based on using a modified CATV RF converter with a digital prescaler, followed by a mixer and 10.7 MHz IF where standard receiver IF filters are used. A ramp generator, with selectable scan widths, provides output to the CATV module VCO and sweep for your low frequency scope which is used for the spectral display. A logarithmic conversion amplifier provides a wide CRT vertical viewing range which is calibrated in db.

The prescaler output is fed to a digital counter which subtracts the VCO offset and provides a three digit center frequency LED display. SEE OUR PRICE LIST FOR AVAILABLE KITS & ASSEMBLIES.

FEATURES;

Logarithmic Amplitude Display, Calibrated in 10 db steps

3 Digit LED Center Frequency Display

12 Position Calibrated Scan Width, 1 KHz to 50 MHz

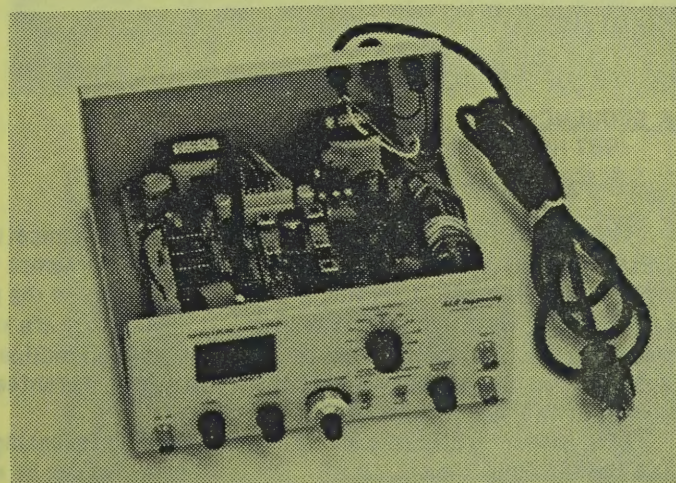
Switchable Bandwidth, Wide = 300 KHz, Narrow = 10 KHz

Switchable Video Filter

Variable Scan Rate

Variable IF Attenuator for comparison measurements

Use your Low Frequency Scope for the Display Portion

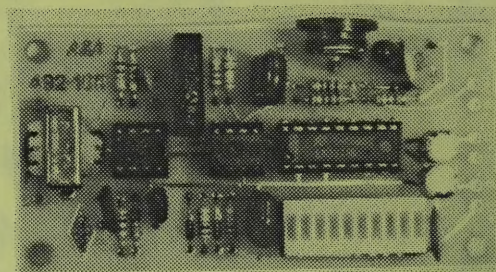


HF WEFAX (FM Detector w/Tuning Aid) - #109

MAR 86 QST by Keith Sueker, W3VF

With this simple receiving adapter and accompanying software, you may print REAL-Time facsimile maps on a dot-matrix printer. Most maritime nations broadcast facsimile weather maps to ships at sea. The maps cover a broad range of weather-related phenomena and a wealth of other information. Please refer to MAR 1986 QST for additional details.

Software available for Apple, IBM, C64, & Atari.

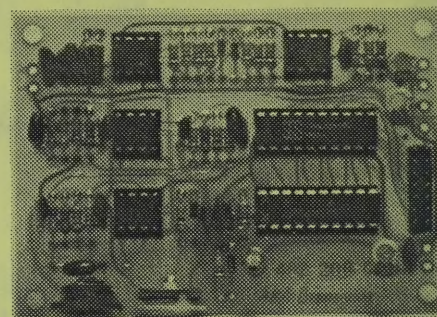


2.4 KHz AM Demodulator - #206

by A & A Engineering

Software by Elmer Schwittek K2LAF

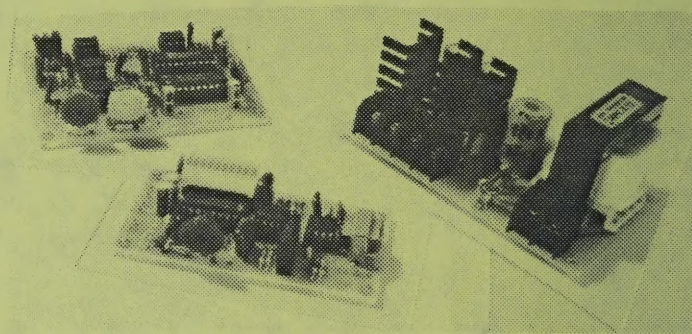
2.4 KHz AM Demodulator with 8 bit A-D was created to support Elmer Schwittek's Multifax program. You'll be able to copy wefax from GOES Satellites, Apt from NOAA Polar Orbiting Satellites, and Wefax rebroadcasts from TV Transponders in up to 16 colors.



MULTIFAX DISCOUNT PACKAGE #208 & #210

Our #206, 2.4 KHz AM Demodulator with 8 bit A-D, used in conjunction with our #109, HF FM Demodulator allows you to enjoy receiving high resolution, multicolor maps and charts.

The #206 requires $\pm 12V$ & $+5V$ and the #109 requires $\pm 12V$. We offer a discount package which includes one each #109 HF, #206 Satellite, #133 Triple Output Power Supply. Available as kits or assembled & tested circuit boards. Please note that cabling and enclosures are NOT INCLUDED.

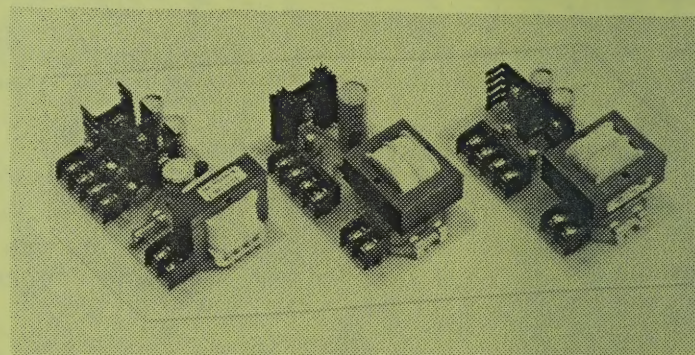


GENERAL PURPOSE POWER SUPPLIES - #130-#139

by A & A Engineering

These general purpose power supplies were created to supply the needs of Hams, hobbyists and experimenters. All supplies feature three terminal regulators which have built in over current and over temperature protection.

Separate screw terminal blocks are furnished for inputs and outputs. Each supply is equipped with an on board fuse, heat sinking and printed circuit power transformer.



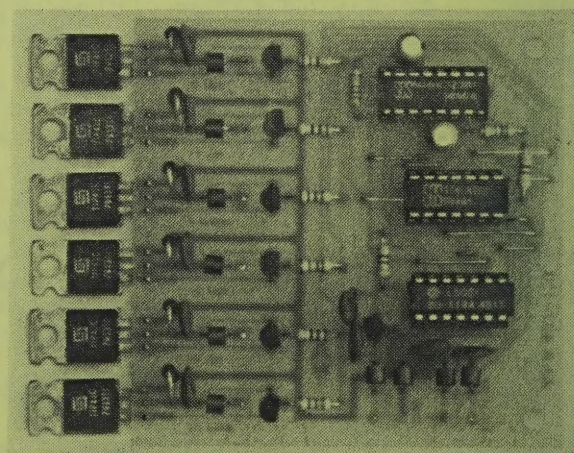
T-R SEQUENCER - #170

1987 Handbook by Dick Jansson, WD4FAB

Space Communications, Chap 23, Page 20

Featured in the 1987 Handbook under Space Communications, Chapter 23, Page 20. One important aspect of using GaAsFET preamps with transmitting equipment is getting everything to switch in the proper sequence. If transmitters, amplifiers and antenna relays are keyed simultaneously, it's likely that RF will be applied to a feedline before the relays are fully closed. Such bursts of RF energy are guaranteed to destroy the GaAsFET in the preamplifier.

Dick Jansson's circuit provides the necessary sequencing that will insure the safety of the equipment. The logic provided can be applied to any station and crossband operation for satellite service is fault free. Operating highly sensitive receiving equipment on the VHF and UHF bands is now a pleasure without the fear of having to replace expensive GaAsFETs.



DIGITAL MEMORY VOICER - #175
DEC 88 QST by Kevin Balmforth, NC6U

A & A Engineering announces the Memory Voicer, a powerful voice "store and play" accessory for contesters and DX'ers. The Memory Voicer can be used to store any often repeated phrase in the operator's own natural voice, such as a CQ or contest exchange, and play it back instantly at the touch of a button. Features include a 7 message - 65 second storage capacity, record VOX, message editing capability, auto repeat, high quality audio, built-in audio monitor, and ease of use.

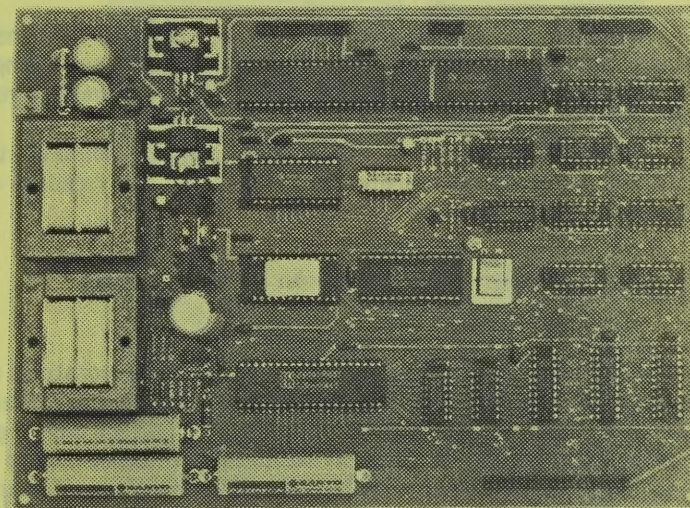
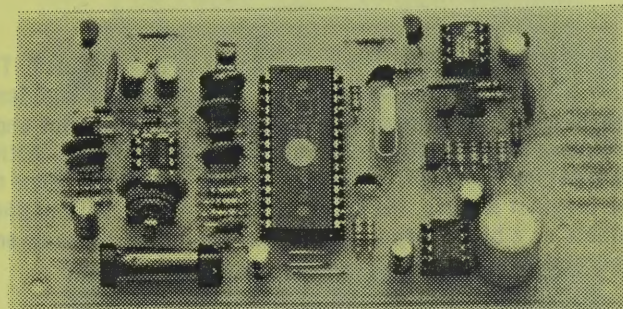
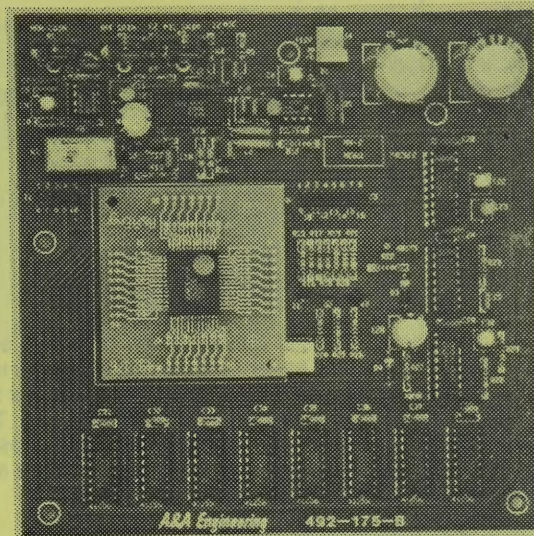
The Memory Voicer can store up to 7 different voice messages at one time. Each message can be of any length, provided the total length of all 7 messages does not exceed 65 seconds. When a message is played back, it may be automatically repeated after a delay ranging from 0 to 13 seconds, as selected by the operator. The auto repeat is enabled or disabled by a front-panel switch.

DIGICOM > 64: C64 Packet #154

AUG 88' 73 Magazine by Barry Kutner, W2UP

A software-based **PACKET** radio system for the Commodore 64 by Barry Kutner, W2UP that appeared in the AUG 88 issue of 73 magazine, page 22. The software is public domain and was created by DL2MDL, DL3RDB and DL8MBT with english translation by DL1SBR. YV1AQE provided the basic circuit which has been improved by W2UP. The system software requires a simple modem interface to the C64 which is provided by our kit. The board can be plugged directly into the cassette port or remote mounted via a cable. The optional watchdog timer, reed relay PTT and PTT inversion options are all included in our kit. The modem circuit requires no external power, all operating power is derived from the computer. The modem circuit is built around the popular AM 7910 chip so no alignment is required, a single switch allows HF or VHF operation.

A blank PCB, software, full kit or an assembled and tested unit, is available. Please refer to our current price list for ordering options and pricing details.



ARRL MICROCONTROLLER - #125

JLY 86 QST by Jon Bloom, KE3Z

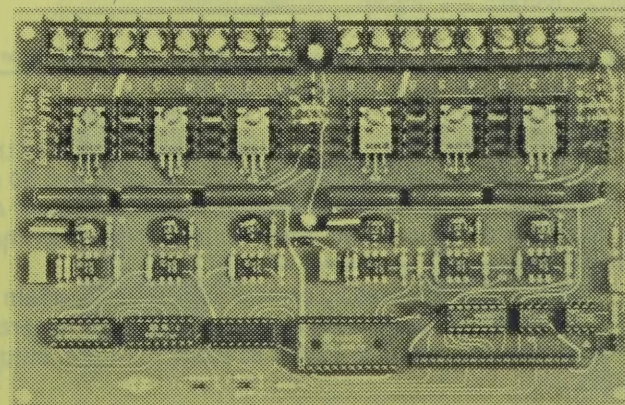
Although many amateurs consider a personal computer a key element of their station, few are using microprocessors as building blocks for homebuilt equipment. There are many applications of a microprocessor for which a personal computer is overkill, such as; repeater controllers, antenna controllers, automatic antenna-matching networks, QSO "robots" and logic-replacement tasks. An excellent example of the latter is John Langner's (WB2OSZ) Talking Frequency Display (#105, see APRIL 85' QST. For more information on the microprocessor, please refer to Jon Bloom's article in July 86' QST.

ARRL ANTENNA ROTOR INTERFACE - #128

SEPT 86' QST by Jon Bloom, KE3Z

The first ARRL project to use the ARRL Microcontroller Board. This system is a two channel fully automatic controller and allows you to control two antenna rotators simultaneously. The rotators are wholly independent of one another, although they may be physically attached, as in a satellite azimuth/elevation system. The rotators themselves will typically be commercially acquired. This design assumes that the rotators have 28-V ac motors and include a linear feedback potentiometer. This is typical of most of the rotators used in amateur antenna systems. Commands are given to the controller to position the antennas from either a front-panel keypad or from a serial RS-232-C device such as a personal computer. For more information on this kit please refer to Jon's Bloom's article in the Sept 86' QST magazine.

PLEASE NOTE: If you intend to use this system with the ARRL Microcontroller, you should order the EPROM with JON BLOOM's rotator program.



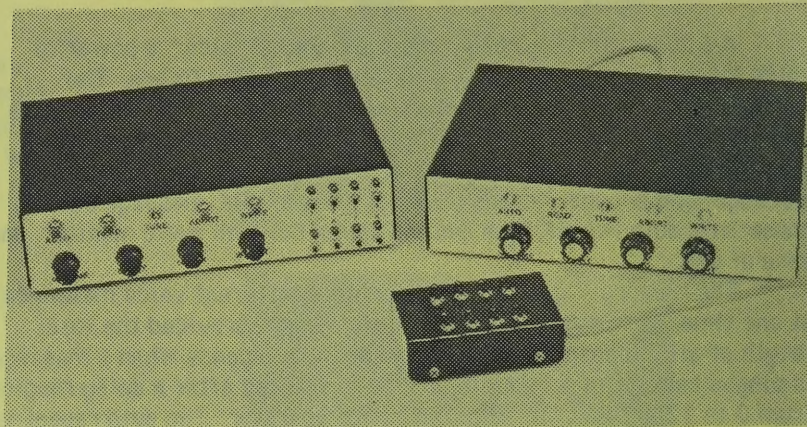
DELUXE MEMORY KEYS - #144

1988 Handbook by Tom Miller, NK1P
Digital Equipment, Chap. 29, Page 9

Featured in the 1988 Handbook, Chapter 29-9. This keyer has Ultra-low power consumption, and MOSFET keying outputs to accommodate virtually any rig. Designed around Curtis 8044 series chip and features the following:

- *Optional remote-mounting of the memory pushbuttons.
- *Ultra-low power consumption-less than 5 mA average.
- *Mosfet keying outputs to accommodate virtually any rig.
- *Single, low-profile circuit board
- *Uses commonly available, inexpensive IC's.
- *Can use a eeprom to provide nonvolatile memory.

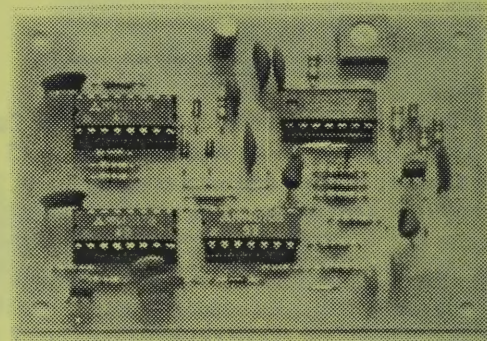
One of the major design goals of this keyer was to include as many features as possible while keeping power consumption low and price moderate. This goal was accomplished through the use of 4000 series CMOS logic, a Curtis 8044 series keyer IC and a low-power memory IC. The Curtis keyer IC helps reduce circuit complexity; it is used for dot and dash generation (Iambic operation is optional) and weighting (positive or negative). Full kit including enclosure is available.



IAMBIC KEYS - #151

JUN 88 QST by Paul Newland, AD7I

Need a small, low cost, low-current-drain keyer? This four-IC CMOS unit will have you slinging flawless strings of dots and dashes in no time. Designed by Paul Newland, AD7I, the unit features dot and dash memory, side tone generator and key circuit current amplifier. Although the low level sidetone generator and keyer current amplifier were touted as options in the original article, the kit we offer includes both of these functions. Available as a blank circuit board, kit including board or an assembled and tested board.

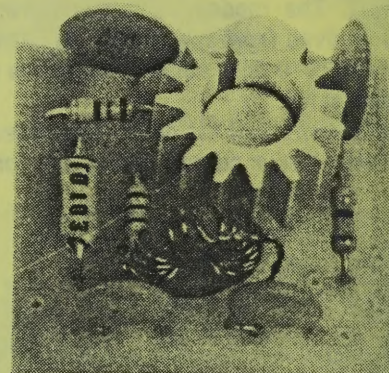


LOW NOISE RF AMP - #101

AUG 84 QST by Wayne Cooper, AG4R

An 11dB gain, one transistor, low noise RF amplifier that can be used in a variety of applications. Intended as an add on RF amplifier for a receiver with a weak front end. It may also be used to replace a RF stage or as an addition to a QRP receiver.

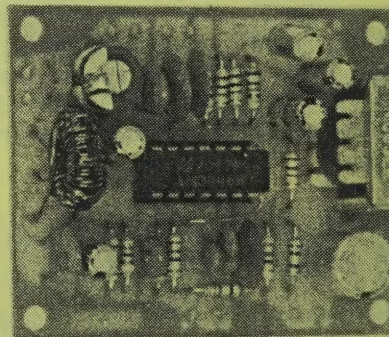
The unit is built on a 1.25 X 1.30 inch circuit board so it can fit virtually anywhere. It operates on 12 to 15 VDC and requires 40 - 50 mA. Input and output impedance is 50 ohms.



DIRECT CONVERSION RCVR FRONT END - #108

AUG 85 QST by Doug DeMaw, W1FB

This proven, single IC, receiver front end incorporates a singly balanced product detector which virtually eliminates unwanted AM detection. Simply add a LO and audio amp and you have a good performer for the 30 & 40 meter bands. With a minor change to the input transformer along with the proper LO frequency, it may be used on 160, 80, 75, and 20 meters. An RF amp is not needed ahead of the detector for bands below 20 but a low noise preamplifier is suggested for 20 meters and higher.



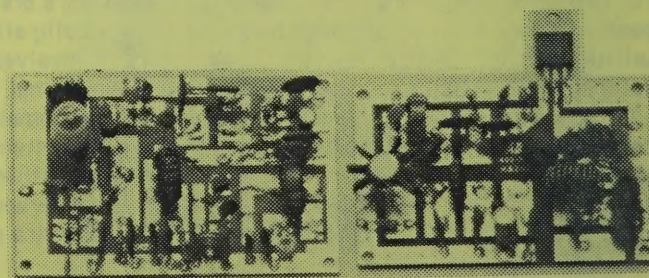
80M, 40M, 30M, POWER AMP & VFO - #126 & #127

DEC 86 QST by M. Materson, KA2HZA

Got a hankerin' to build a simple CW transmitter that's a real performer? Take your pick-one or all- for 80, 40, and 30 meters. They are all built using the same circuit boards, one for the Power Amp and one for the VFO. Only the components and circuit configuration change for the different bands.

Stability is achieved by careful selection of certain components while other critical paths have multiple capacitors in parallel to share RF currents. The unit requires 12VDC at about 2.5 Amps, output is 12 to 20 Watts.

Our kits consist of both circuit boards and all components, air variable capacitor and ceramic core included. Please refer to December 86' QST for full circuit details. A cabinet is not included in kit.



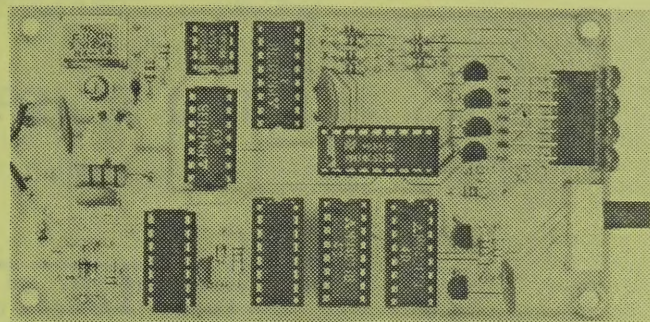
LOW COST HF COUNTER - #165

FEB 89 QST by D. Bainbridge, NOHPK
& Paul Pagel, N1FB

Would you like to eliminate that complex dial and crystal calibrator in your next home brew project? Or would a low cost HF frequency counter be a welcome addition to that second hand outfit you just bought? Maybe this project was intended for you.

This counter has only four digits, but with a flip of the range switch, you can read 1 to 30 MHz with a resolution of 100 Hz. The circuit board measures only 2.3 in. X 4.5 in. and the panel space could be as small as 0.4 in. X 0.8 in. for the display plus the DPDT miniature range switch. A 5V power supply operating at 40 ma is sufficient to power the counter and drive the bright LED bubble display.

A & A Engineering offers blank circuit boards, full kits of parts and assembled and tested units. All of our kits and assemblies are supplied with sockets for all of the IC's.

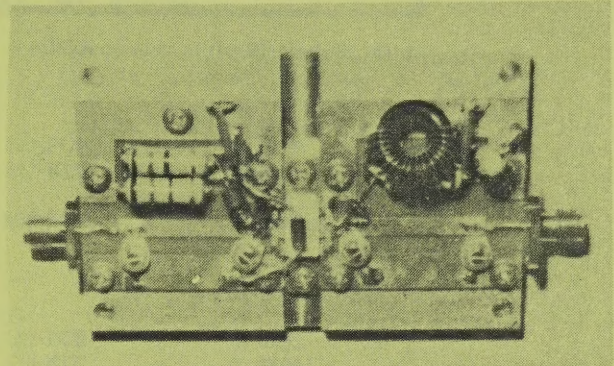


1296 MHz POWER AMPLIFIERS - #120

DEC 85 QST by Al Ward, WB5LUA
1986 & 87 Handbook, Chap. 32

With the ever increasing number of 1296 MHz transverters on the market today, there is a demand for a simple and economical way to generate higher power than the typical .5 - 1 W these transverters provide. Here are two solid state amplifiers that can provide 10 to 20 W output.

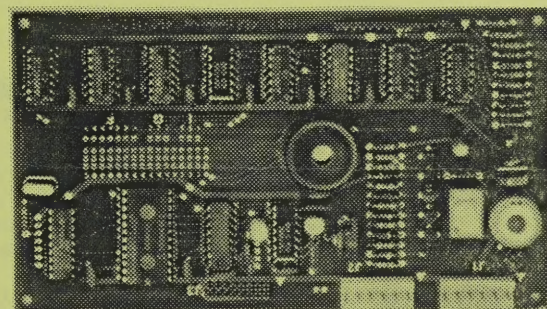
Power gains as high as 17 dB are possible with a two stage amplifier (NEL1306 driving a NEL1320). With 200 mW of drive, 10 W output is possible. When the pair of amplifiers is driven with 1 W and tuned for maximum power out, 18-20W is achievable.



DTMF DECODER & SELECT CALL SYSTEM - #152

FEB 88' QST by V. Yakomovich, AA4MY

This inexpensive, simple-to-build project monitors the repeater for you! You can eliminate idle chatter and make sure you receive all your calls. This SELCALL unit responds to both an individual and a group call code and provides a means of controlling external equipment with DTMF tones. No exotic test equipment is necessary to align the completed unit. Other projects or planned additions to the circuit can be made. These projects may include an LED display, or a memory unit that allows others to access your SELCALL and leave their SELCALL code (or phone number).



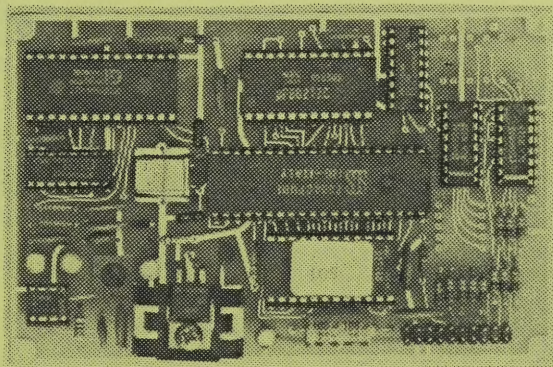
TALKING FREQUENCY DISPLAY - #105

APL 85 QST by John Langer, WB2OSZ

The talking frequency display was originally intended to "speak" the numbers present on the frequency display of an amateur HF transceiver. It's design is based on a preprogrammed chip set used in most talking clocks.

Talker input circuitry is CMOS and can interface directly to most vacuum fluorescent readouts without difficulty. Installation usually requires connecting 15 wires to the rig and choosing the proper input IC's on the board.

Since most HF rigs have a six digit readout, the original talker was set up to voice these six digits. We now have programs to voice the four LSB's for use on 2 meter rigs or rigs like the TEN-TEC Argosy II.



SMART BATTERY CHARGER - #150

JUN 87' QST by Warren Dion, W1BBH

This **SMART** battery charger is for GEL CELLS or LEAD ACID batteries. It controls bulk current, tapers and limits the overcharge voltage, after which it dutifully maintains the battery float level. This charger can be connected to the battery **INDEFINITELY**, it will not overcharge! Great for HAM use as well as Boat, Motorcycle, Dune-buggy, RV, Burglar Alarm or any application where the battery is not used for a long period of time. Standard kit is 12V @ 1/2 AMP. We also offer 6V, 14V or 24V versions, see price list for details. The KIT includes all parts necessary to build a complete charger, there is nothing else to buy.



FEBRUARY 1989 PRICE LIST

DESCRIPTION	ITEM	ORDER #	PRICE
-------------	------	---------	-------

450 MHz SPECTRUM ANALYZER

Adapted from NOV 85 QST article by Al Helfrick, K2BLA
 3 Digit LED Center Frequency Digital Readout
 12 Position Calibrated SCAN WIDTH, 1 KHz to 50 MHz
 Switchable Bandwidth, Wide = 300 KHz, Narrow = 10 KHz
 Use your Low Frequency Scope for the Display Portion
 LOG output, calibrated in 10 db steps

This analyzer utilizes a modified CATV RF module for the front end. A full kit consists of the RF module, main circuit assembly, LED assembly, power supply assembly and enclosure.

MAIN & LED Display Circuits

Circuit Boards ONLY, both PCB's	117-PCB	\$ 39.95
Main & LED display kit, w/both PCB's	117-KIT	\$269.95

450 MHz RF Module

(Includes modification parts and instructions)

450-RFM	\$ 65.00
---------	----------

POWER SUPPLY

(provides: -22V, -25V, +12V -12V, +5V Digital & +5V Display)

Circuit BOARD ONLY	119-PCB	\$ 15.95
COMPLETE KIT (110VAC INPUT)	KIT w/PCB	\$ 69.95
EXPORT KIT (230VAC 50 Hz IN)	KIT w/PCB	219-KIT \$ 74.95

ENCLOSURE KIT All Metal, 8.25 X 8.25 X 3.50

Prepunched, painted and lettered

121-KIT	\$ 65.00
---------	----------

COMPLETE 450 MHz Analyzer KIT

(Includes - Enclosure, RF Module, Power Supply, Main & LED Kits)

450-KIT	\$459.95
---------	----------

FREQUENCY SYNTHESIZER 1 Hz to >6.5 MHz

This direct digital synthesizer provides about 1/2 Volt pk to pk output with 1 Hz resolution from 1 Hz to in excess of 6.5 MHz.. Features include keyboard frequency entry and seven digit LED frequency readout.

FREQ SYN - RF BOARD

PCB ONLY	102-PCB	\$ 19.95
KIT w/PCB	102-KIT	\$179.95
ASSEMBLED	102-ASY	\$239.95

FREQ SYN - CONTROLLER

PCB ONLY	103-PCB	\$ 19.95
KIT w/PCB	103-KIT	\$ 79.95
ASSEMBLED	103-ASY	\$ 99.95

ACCESSORIES

12 Key Keyboard	ASY&Cable	172-ASY	\$ 26.95
20 Key Keyboard	ASY&Cable	252-ASY	\$ 32.95
7 digit .360 LED Display	KIT w/PCB	195-KIT	\$ 35.95
	ASY&Cable	195-ASY	\$ 49.95

NOTES:

- 1) #195 includes Bezel & Filter assembly for panel mounting.
- 2) #252 keyboard has 8 blank keys for your custom use.

SYNTHESIZER DISCOUNT PACKAGES:

Sub-assemblies for custom use, one each #102, #103, #172 and #195, no power supply or enclosure provided.

in KIT FORM	205-SYS	\$ 279.95
Assembled & Tested	202-SYS	\$ 369.95

BENCH TOP INSTRUMENT

Measures 8.25 X 6.25 X 3.25 - 110 Volt AC input, BNC Output

Full Kit w/Pwr Supply & Enclosure	215-KIT	\$ 349.95
Fully assembled and tested bench unit	207-ASY	\$ 429.95

Custom built quadrature unit

provides both SINE and COSINE OUTPUTS	213-ASY	\$ 499.95
---------------------------------------	---------	-----------

LOW COST HF COUNTER

FEB 89 QST

By Douglas Bainbridge, NOHPK
and Paul Pagel, N1FB

PCB ONLY	#165-PCB	\$ 12.95
KIT w/PCB	#165-KIT	\$ 39.95
ASSEMBLED	#165-ASY	\$ 59.95

GENERAL PURPOSE POWER SUPPLIES

By A & A Engineering

+5V @360mA	PCB ONLY	#130-PCB	\$ 6.95
	KIT w/PCB	#130-KIT	\$ 22.95
	ASSEMBLED	#130-ASY	\$ 29.95
+5V @360mA & $\pm 12V$ @ 60 mA	PCB ONLY	#133-PCB	\$ 7.95
	KIT w/PCB	#133-KIT	\$ 29.95
	ASSEMBLED	#133-ASY	\$ 39.95
(220V 50 Hz input)	KIT w/PCB	#233-KIT	\$ 34.95
(220V 50 Hz input)	ASSEMBLED	#233-ASY	\$ 44.95
+5V @360mA & $\pm 15V$ @ 50 mA	PCB ONLY	#135-PCB	\$ 7.95
	KIT w/PCB	#135-KIT	\$ 29.95
	ASSEMBLED	#135-ASY	\$ 39.95
$\pm 12V$ @ 175 mA	PCB ONLY	#137-PCB	\$ 7.95
	KIT w/PCB	#137-KIT	\$ 24.95
	ASSEMBLED	#137-ASY	\$ 32.95
$\pm 15V$ @ 150 mA	PCB ONLY	#139-PCB	\$ 7.95
	KIT w/PCB	#139-KIT	\$ 24.95
	ASSEMBLED	#139-ASY	\$ 32.95

ORDERING INFORMATION

Thank you for inquiring about our Ham Radio and Computer Products. Enclosed please find information on the Circuit Boards, Kits and Assembled & Tested items we presently offer. Most of these projects have been featured in QST Magazine or the ARRL Handbook. For detailed information, please refer to the original article. Reprints of most articles are available from us for \$1.00 each.

Unless otherwise noted, all kits are board level kits and do not include enclosure, interconnect cables etc. All circuit boards are FR-4 epoxy, etched, drilled, plated and ready for use. Everything you purchase from us must be satisfactory or we will replace the item or refund your money. WE cannot be responsible for incorrect assembly, bad workmanship or items damaged by the builder.

We accept VISA or MASTERCARD orders via mail, FAX or phone (\$20.00 minimum). We also accept United Parcel COD orders via mail or phone for US destinations ONLY. For United Parcel COD orders, there is a \$3.00 fee and you are also billed for the exact shipping and insurance charges.

You may purchase a partial kit, we do fill partial orders. Send Large SASE for itemized price list for the kit of interest. Please allow about one week extra processing time on partial orders.

DOMESTIC ORDERS:

We prefer to ship all orders by United Parcel Service and therefore request a street Address. Small orders or orders to a P. O. Box are sent first class mail.

For PREPAID or BANKCARD ORDERS shipped to the USA only, include shipping costs as follows;



Less than	\$ 9.99	add	\$1.00
\$10.00..to...	\$49.99	add	\$2.50
\$50.00..to...	\$99.99	add	\$3.50
\$100.00 and up		add	\$4.50



For United Parcel 2nd DAYAIR service to US destination, include **additional \$4.50** per order.

FOREIGN ORDERS:

Foreign orders require special handling. We prefer to ship by air parcel post, insured. For postage include 15% of the total order, \$5.00 minimum. For insurance - where postal regulations allow - include additional \$1.00 per \$100.00 of order. Please note that postal regulations vary, - many countries do not allow insurance for the full value. WE ARE NOT RESPONSIBLE FOR UNINSURED SHIPMENTS. Prices are in US DOLLARS, FOB Anaheim CA, USA. Customer is responsible for all import duties & taxes. Foreign orders are marked "Amateur Radio Parts - No Commercial Value". Specify if you require other markings.

California Residents MUST add 6% sales tax